

We claim:

1. A method of making a modified allergen which is less reactive with IgE comprising
 - (a) identifying IgE binding sites in an allergen;
 - (b) modifying the allergen by mutating at least one amino acid in an IgE binding site or reacting the allergen with a compound blocking binding to at least one amino acid in an IgE binding site;
 - (c) screening for IgE binding to the modified allergen using serum or antibodies from a pooled patient population and screening for activation of T cells; and
 - (d) selecting the modified allergens which have decreased binding to IgE as compared to the unmodified allergen and which activate T cells.
2. The method of claim 1 further comprising screening for binding of the modified allergen for binding to IgG and selecting the modified allergens which have decreased binding to IgE, activate T cells and bind to IgG.
3. The method of claim 1 wherein the modified allergen is mutated in the center of one or more of the IgE binding sites.
4. The method of claim 1 wherein the modified allergen is mutated by substituting a hydrophobic amino acid in the center of one or more of the IgE binding sites with a neutral or hydrophilic amino acid.
5. The method of claim 1 wherein binding of IgE to the modified allergen is blocked by reaction of a compound with at least one amino acid present in an IgE binding site.
6. The method of claim 5 wherein binding of IgE is blocked by reaction of the allergen with an antibody which blocks binding to one or more IgE sites but allows the allergen to still activate T cells.
7. The method of claim 1 wherein the modified allergen is a portion of a protein.

8. The method of claim 1 wherein the modified allergen is formulated with an adjuvant selected from the group consisting of IL 12, IL 16, IL 18, Ifn- γ or immune stimulatory sequences.
9. The method of claim 1 wherein the modified allergen is screened for initiation of a T cell helper 1 response.
10. The method of claim 1 wherein the modified allergen is made in a recombinant host selected from the group consisting of plants, animals, bacteria, yeast, fungi, and insect cells.
11. The method of claim 1 wherein the modified allergen is made in cells using site specific mutation.
12. The method of claim 1 wherein the modified allergen is made from a peanut allergen selected from the group consisting of Ara h 1, Ara h 2, and Ara h 3.
13. The method of claim 1 wherein the modified allergen is based on a protein obtained from a source selected from the group consisting of legumes, milks, grains, eggs, fish, crustaceans, mollusks, insects, molds, dust, grasses, trees, weeds, mammals, birds, and natural latexes.
14. A modified allergen which is less reactive with IgE comprising at least one IgE binding site present in the allergen modified by at least one amino acid change or having at least one amino acid bound by a compound so that the site no longer binds IgE, wherein the modified allergen activates T cells.
15. The modified allergen of claim 14 wherein the modified allergen binds IgG.
16. The modified allergen of claim 14 made by the process of
- identifying one or more IgE binding sites in an allergen;
 - mutating at least one amino acid in an IgE binding site;
 - screening for IgE binding to the mutated allergen and activation of T cells by the mutated allergen; and

(d) selecting the modified allergens with decreased binding to IgE which activate T cells.

17. The modified allergen of claim 14 wherein the modified allergen is mutated in the center of one or more of the IgE binding sites.

18. The modified allergen of claim 14 wherein the modified allergen is mutated by substituting a hydrophobic amino acid in the center of one or more of the IgE binding sites with a neutral or hydrophilic amino acid.

19. The modified allergen of claim 14 wherein binding of IgE is blocked by reaction of a compound with at least one amino acid present in an IgE binding site.

20. The modified allergen of claim 19 wherein binding of IgE is blocked by reaction of the allergen with an antibody which blocks binding to one or more IgE sites but allows the allergen to still activate T cells.

21. The modified allergen of Claim 20 wherein the modified allergen does not have significantly altered or decreased IgG binding capacity.

22. The modified allergen of claim 14 which initiates a T cell helper 1 response.

23. The modified allergen of claim 14 wherein the allergen is a portion of a protein.

24. The modified allergen of claim 14 wherein the modified allergen is formulated with an adjuvant selected from the group consisting of IL 12, IL 16, IL 18, Ifn- γ and immune stimulatory sequences.

25. The modified allergen of claim 14 wherein the modified allergen is made in a transgenic plant or animal.

26. The modified allergen of claim 14 expressed in a recombinant host selected from the group consisting of plants and animals.

27. The modified allergen of claim 17 expressed in a recombinant host selected from the group consisting of bacteria, yeast, fungi, and insect cells.

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28. The modified allergen of claim 14 wherein the modified allergen is based on a protein obtained from a source selected from the group consisting of legumes, milks, grains, eggs, fish, crustaceans, mollusks, insects, molds, dust, grasses, trees, weeds, mammals, birds, and natural latexes.
29. The modified allergen of claim 14 wherein the modified allergen is made from a peanut allergen selected from the group consisting of Ara h 1, Ara h 2, and Ara h 3.
30. A nucleotide molecule encoding a modified allergen which is less reactive with IgE comprising at least one IgE binding site present in the allergen modified by at least one amino acid change so that the site no longer binds IgE, but wherein the modified allergen activates T cells, as defined by any of claims 14, 15, 16, 17, 18, 21 or 22.
31. The molecule of claim 30 in a vector for expression in a recombinant host.
32. A nucleotide molecule for causing a site specific mutation in a gene encoding a protein which yields a modified allergen which is less reactive with IgE comprising at least one IgE binding site present in the allergen modified by at least one amino acid change so that the site no longer binds IgE, but wherein the modified allergen activates T cells.
33. A transgenic plant expressing a modified allergen which is less reactive with IgE comprising at least one IgE binding site present in the allergen modified by at least one amino acid change so that the site no longer binds IgE, but wherein the modified allergen activates T cells, as defined by any of claims 14, 15, 16, 17, 18, 19, 20, 21, 22, or 23.
34. A transgenic animal expressing a modified allergen which is less reactive with IgE comprising at least one IgE binding site present in the allergen modified by at least one amino acid change so that the site no longer binds IgE, but wherein the modified allergen activates T cells, as defined by any of claims 14, 15, 16, 17, 18, 19, 20, 21, 22, or 23.

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35. A compound selectively binding to at least one amino acid in an IgE binding site of an allergen, wherein the site no longer binds IgE, but wherein the allergen is able to activate T cells, wherein the compound is obtained using a combinatorial library or combinatorial chemistry and screening for reaction with the allergen to produce bound allergen, followed by testing of the bound allergen for binding to IgE and activation of T cells.
36. A method to treat an individual to reduce the clinical response to an allergen comprising administering to the individual a modified allergen which is less reactive with IgE comprising at least one IgE binding site present in the allergen modified by at least one amino acid change or having at least one amino acid bound by a compound so that the site no longer binds IgE, wherein the modified allergen activates T cells, as defined by any of claims 14-29, in an amount and for a time sufficient to reduce the allergic reaction to the unmodified allergen.

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